

Features

- Fully electronic semi-conductor relays
- High switching speed and endurance
- Switch-on at voltage zero crossing, with relays with zero voltage switch
- Switch-off in current zero crossing
- Silent switching
- Spark- and bounce-free switching
- Electrical isolation between control circuit and switching circuit
- Low control power
- Logic compatibility (TTL)
- Not sensitive to vibration, impact or extreme environmental conditions

Typical applications

- Heating control systems
- Ovens and cookers
- Photocopying machines
- High performance laser printers
- Medical equipment
- Industrial controls
- Traffic signaling systems

Design

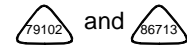
- With or without zero voltage switch
- One- and three-phase relay types
- Switching circuit: triac or 2 anti-parallel thyristors; corresponds to one make contact
- Terminal type: PCB and screw
- Plastic coating
- Dust-protected (V23100-S... Type C2) or immersion cleanable

Approvals



VDE

Marks of conformity

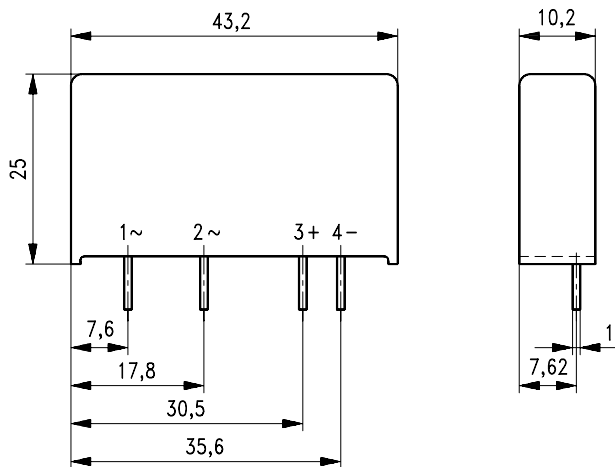


UL

ML File E 85134 and
ML File E48393

Solid State Relays (SSR) Type B404

Dimension drawing (mm)



Tolerances $\pm 0,3$ mm

ECR1050-9

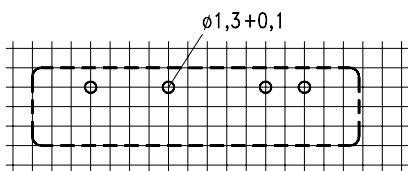


ECR0980-B

Illustration approximately same size as original

Mounting hole layout

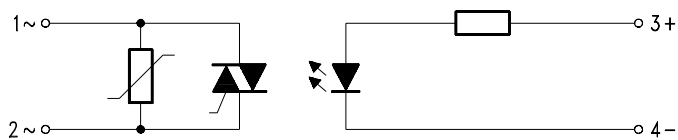
View on the terminals



ECR1051-H

Basic grid dimension 2.54 mm in accordance with EN 60097

Terminal assignment



ECR1052-Q

Simplified circuit diagram

Solid State Relays (SSR) Type B404

SSR with zero voltage switch for PCB mounting

Ordering code	V23107	-S4022-B404	-S4023-B404	-S4042-B404	-S4043-B404
Control circuit (typical values at 20 °C)					
Minimum control voltage	2.5 V–		4 V–		
Maximum control voltage	10 V–		30 V–		
Minimum control current	3 mA–				
Maximum control current	30 mA–				
Release voltage	0.8 V–				
Control circuit resistance	330 Ω		1,000 Ω		
Switching circuit (typical values at 20 °C)					
Maximum switching current (see characteristic page 13)	4 A _{rms}				
Minimum switching current	5 mA _{rms}				
Nominal switching voltage	230 V _{rms}	400 V _{rms}	230 V _{rms}	400 V _{rms}	
Switching voltage range	12...275 V _{rms}	12...460 V _{rms}	12...275 V _{rms}	12...460 V _{rms}	
Maximum repetitive blocking voltage (Voltage limited by varistor)	600 V _S (450 V _S)	1,000 V _S (720 V _S)	600 V _S (450 V _S)	1,000 V _S (720 V _S)	
Zero voltage range	±12 V _S				
Maximum surge current (ITSM, 10 ms) (see surge current gradient page 13)	100 A _S				
Leakage current at nominal switching voltage (50 Hz)	0.3 mA _{rms}				
Peak load integral (I ² t, 10 ms)	50 A ² s				
Critical rate of rise on-state current (di/dt)	20 A/μs				
Critical rate of rise off-state voltage (du/dt)	500 V/μs				
Max. on-state voltage at max. switching current	1.6 V _S				
Operating frequency range	10...440 Hz				
Maximum on- and off-time (50 Hz)	10 ms				
Insulation					
Test voltage between control circuit and switching circuit	4 kV _{rms}				
General data					
Operating temperature range	–40...+80 °C				
Storage temperature range	–40...+150 °C				
Capacity between control circuit and switching circuit	8 pF				
Weight	approx. 20 g				
Approvals	VDE, UL				
N.B.: Clearances and creepage distances in accordance with EN 60950:1992+A1/DIN EN 60950 (VDE 0805):11.93					

Solid State Relays (SSR)

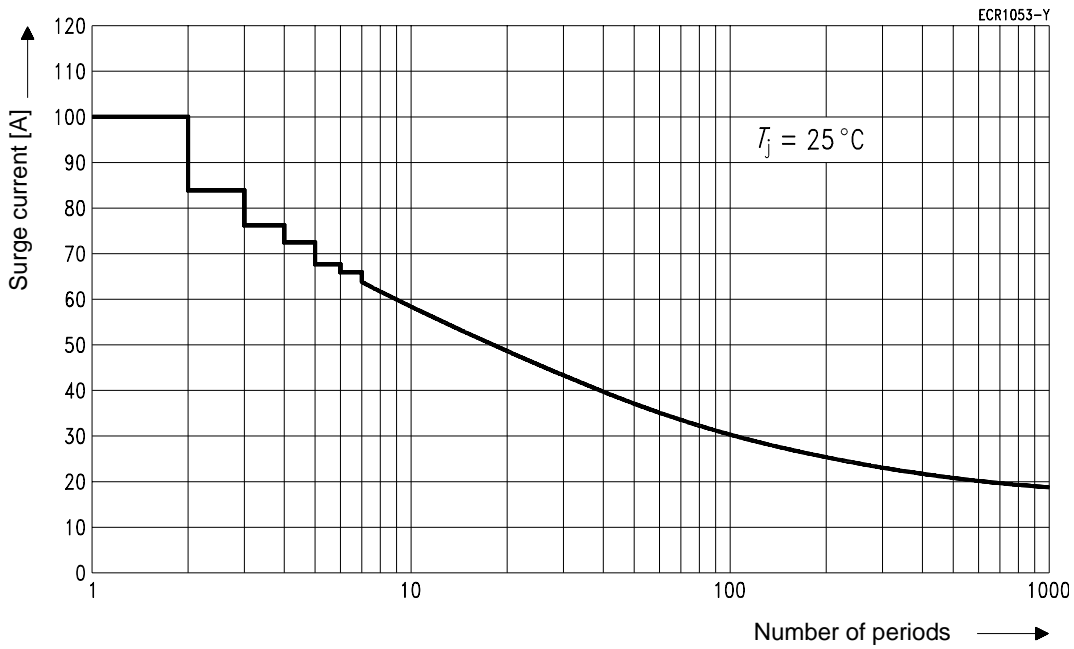
Type B404

SSR without zero voltage switch for PCB mounting

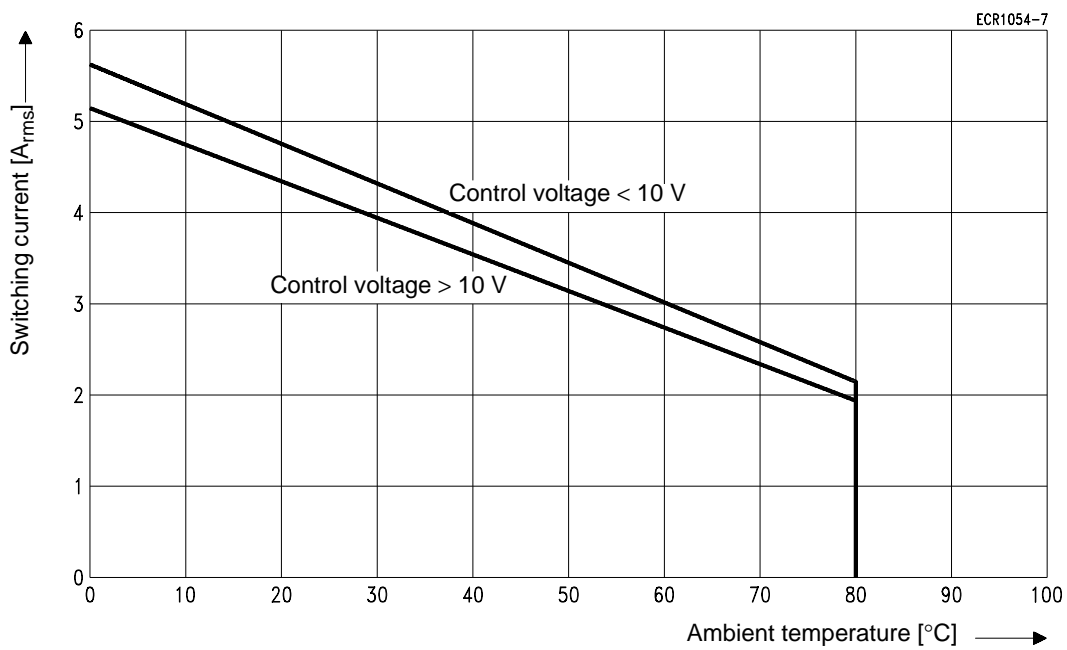
Ordering code	V23107	-S4342-B404	-S4343-B404
Control circuit (typical values at 20 °C)			
Minimum control voltage	3 V ₋		
Maximum control voltage	30 V ₋		
Minimum control current	2 mA ₋		
Maximum control current	30 mA ₋		
Release voltage	0.8 V ₋		
Control circuit resistance	1,000 Ω		
Switching circuit (typical values at 20 °C)			
Max. switching current (see characteristic page 13)	4 A _{rms}		
Minimum switching current	5 mA _{rms}		
Nominal switching voltage	230 V _{rms}	400 V _{rms}	
Switching voltage range	12...275 V _{rms}	12...460 V _{rms}	
Maximum repetitive blocking voltage (voltage limited by varistor)	600 V _S (450 V _S)	1,000 V _S (720 V _S)	
Maximum surge current (ITSM, 10 ms) (see surge current gradient page 13)	100 A _S		
Leakage current at nominal switching voltage (50 Hz)	0.3 mA _{rms}		
Peak load integral (I ² t, 10 ms)	50 A ² s		
Critical rate of rise on-state current (di/dt)	20 A/μs		
Critical rate of rise off-state voltage (du/dt)	500 V/μs		
Max. on-state voltage at max. switching current	1.6 V _S		
Operating frequency range	10...440 Hz		
Maximum on time	0.1 ms		
Maximum off time	10 ms		
Insulation			
Test voltage between control circuit and switching circuit	4 kV _{rms}		
General data			
Operating temperature range	-40...+80 °C		
Storage temperature range	-40...+150 °C		
Capacity between control circuit and switching circuit	8 pF		
Weight	approx. 20 g		
Approvals	VDE, UL		
N.B.: Clearances and creepage distances in accordance with EN 60950:1992+A1/DIN EN 60950 (VDE 0805):11.93			

Solid State Relays (SSR) Type B404

Maximum accidental overload current (not periodical): ITSM



Max. switching current depending on ambient temperature



Solid State Relays (SSR) Types A2 and A8

Dimension drawing (mm) one-phase SSR

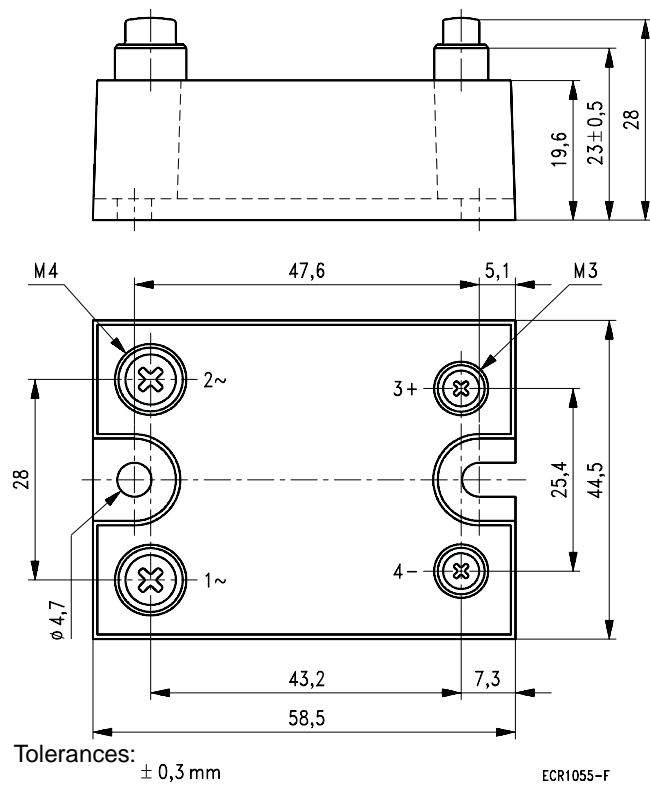
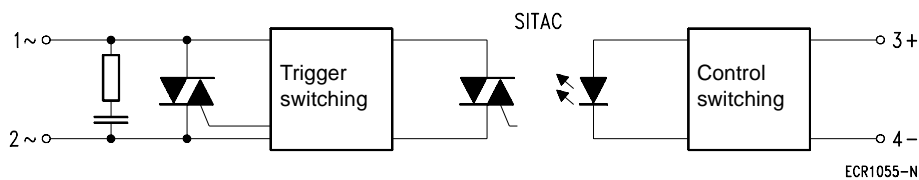


Illustration approximately 2/3 of the original size

Terminal assignment



Simplified circuit diagram

Mounting

Screw terminals for two single-wire cables up to 6 mm² for the switching circuit and up to 4mm² for the control circuit with cable clamps.

Bus bars and heat sinks intended to be unaffected by additional strain and pressure. Power supply leads must have a cross-section sufficient to avoid heating up the relay. This applies particularly to direct mounting with preconnected fuses.

Solid State Relays (SSR) Types A2 and A8

Dimension drawing (mm) Plastic cap

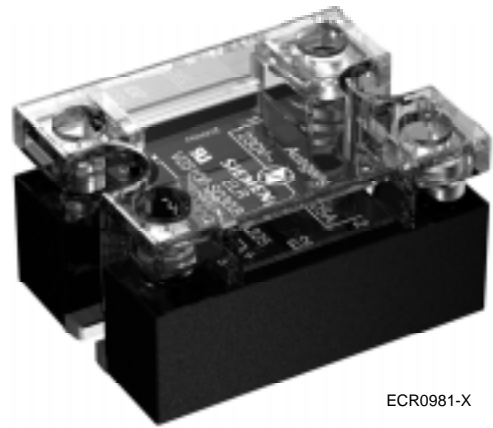
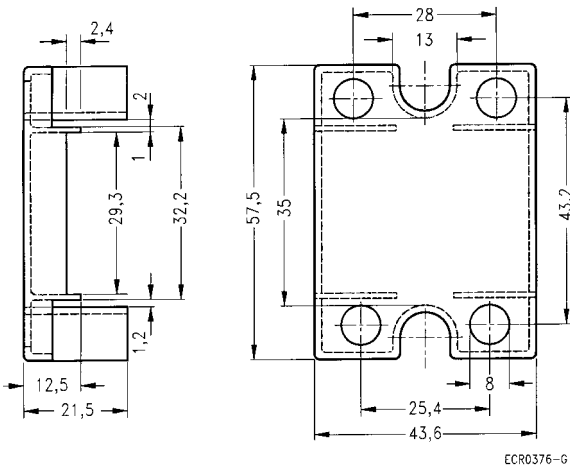


Illustration approximately 2/3 of the original size
Approximate weight: 8 g

Shock-hazard protection against the voltage-carrying terminal clips, in unprotected systems.

Ordering code	V23100-Z2008
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Solid State Relays (SSR)

Single-phase type A2

Single-phase SSR up to 280 V switching voltage with zero voltage switch

Ordering code	V23100	-S0302-A210	-S0302-A225	-S0302-A240
Control circuit (typical values at 20 °C)				
Minimum control voltage	4 V ₋			
Maximum control voltage	30 V ₋			
Minimum control current	5 mA ₋			
Maximum control current	30 mA ₋			
Release voltage	1 V ₋			
Control circuit resistance	1,000 Ω			
Switching circuit (typical values at 20 °C)				
Zero voltage switch	yes			
Max. switching current (see characteristic pages 24...28)	10 A _{rms}	25 A _{rms}	40 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching voltage	230 V _{rms}			
Switching voltage range	12...280 V _{rms}			
Maximum repetitive blocking voltage	600 V _S			
Zero voltage range	± 10 V _S			
Maximum surge current (ITSM, 10 ms)	120 A _S	250 A _S	350 A _S	
Peak load integral (I ² t, 10 ms)	72 A ² s	312 A ² s	610 A ² s	
Leakage current at nominal switching current (50 Hz)	3 mA _{rms}			
Critical rate of rise on-state current (di/dt)	100 A/μs			
Critical rate of rise off-state voltage (du/dt)	500 V/μs			
Max. on-state voltage at max. switching current	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	10 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	2.5 kV _{rms}			
Test voltage between switching circuit and ground	2.5 kV _{rms}			
Insulation resistance	10 ¹⁰ Ω			
General data				
Operating temperature range	-40...+90 °C			
Storage temperature range	-40...+125 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 115 g			
Approvals	UL			
N.B.: Preferred standard types - SBS - main types				

Solid State Relays (SSR)

Single-phase type A2

Single-phase SSR up to 280 V switching voltage with zero voltage switch

Ordering code	V23100	-S4032-A210	-S4032-A225	-S4032-A240
Control circuit (typical values at 20 °C)				
Minimum control voltage	4 V ₋			
Maximum control voltage	30 V ₋			
Minimum control current	5 mA ₋			
Maximum control current	30 mA ₋			
Release voltage	1 V ₋			
Control circuit resistance	1,000 Ω			
Switching circuit (typical values at 20 °C)				
Zero voltage switch	yes			
Max. switching current (see characteristic page 24...28)	10 A _{rms}	25 A _{rms}	40 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching voltage	230 V _{rms}			
Switching voltage range	12...280 V _{rms}			
Maximum repetitive blocking voltage	600 V _S			
Zero voltage range	± 10 V _S			
Maximum surge current (ITSM, 10 ms)	120 A _S	250 A _S	350 A _S	
Peak load integral (I ² t, 10 ms)	72 A ² s	312 A ² s	610 A ² s	
Leakage current at nominal switching voltage (50 Hz)	3 mA _{rms}			
Critical rate of rise on-state current (di/dt)	100 A/μs			
Critical rate of rise off-state voltage (du/dt)	500 V/μs			
Max. on-state voltage at max. switching current	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	10 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	4 kV _{rms}			
Test voltage between switching circuit and ground	4 kV _{rms}			
Insulation resistance	10 ¹⁰ Ω			
General data				
Operating temperature range	-40...+90 °C			
Storage temperature range	-40...+125 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 115 g			
Approvals	UL, VDE			
N.B:	Clearances and creepage distances in accordance with EN 60950: 1988 / DIN VDE 0805/5.90			

Solid State Relays (SSR)

Single-phase type A8

Single-phase SSR up to 520 V switching voltage with zero voltage switch

Ordering code	V23100	-S2034-A810	-S2034-A825	-S2034-A840
Control circuit (typical values at 20 °C)				
Minimum control voltage	5 V–			
Maximum control voltage	30 V–			
Minimum control current	5 mA–			
Maximum control current	30 mA–			
Release voltage	1 V–			
Control circuit resistance	1,000 Ω			
Switching circuit (typical values at 20 °C)				
Zero voltage switch	yes			
Max. switching current (see characteristic pages 24...28)	10 A _{rms}	25 A _{rms}	40 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching voltage	400 V _{rms}			
Switching voltage range	24...520 V _{rms}			
Maximum repetitive blocking voltage	1,200 V _S			
Zero voltage range	± 20 V _S			
Maximum surge current (ITSM, 10 ms)	120 A _S	230 A _S	350 A _S	
Peak load integral (I ² t, 10 ms)	72 A ² s	265 A ² s	610 A ² s	
Leakage current at nominal switching voltage (50 Hz)	3 mA _{rms}			
Critical rate of rise on-state current (di/dt)	100 A/μs			
Critical rate of rise off-state voltage (du/dt)	500 V/μs			
Max. on-state voltage at max. switching current	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	10 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	2.5 kV _{rms}			
Test voltage between switching circuit and ground	2.5 kV _{rms}			
Insulation resistance	10 ¹⁰ Ω			
General data				
Operating temperature range	–40...+90 °C			
Storage temperature range	–40...+125 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 115 g			
Approvals	UL			

Solid State Relays (SSR)

Single-phase type A8

Single-phase SSR up to 520 V switching voltage without zero voltage switch

Ordering code	V23100	-S2234-A825	-S2234-A840
Control circuit (typical values at 20 °C)			
Minimum control voltage	5 V ₋		
Maximum control voltage	30 V ₋		
Minimum control current	5 mA ₋		
Maximum control current	30 mA ₋		
Release voltage	1 V ₋		
Control circuit resistance	1,000 Ω		
Switching circuit (typical values at 20 °C)			
Zero voltage switch	no		
Max. switching current (see characteristic page 24...28)	25 A _{rms}		40 A _{rms}
Minimum switching current	5 mA _{rms}		
Nominal switching voltage	400 V _{rms}		
Switching voltage range	24...520 V _{rms}		
Maximum repetitive blocking voltage	1,200 V _S		
Zero switching range	-		
Maximum surge current (ITSM, 10 ms)	230 A _S		350 A _S
Peak load integral (I ² t, 10 ms)	265 A ² s		610 A ² s
Leakage current at nom. switching voltage (50 Hz)	3 mA _{rms}		
Critical rate of rise on-state current (di/dt)	100 A/μs		
Critical rate of rise off-state voltage (du/dt)	500 V/μs		
Max. on-state voltage at max. switching current	1.6 V _S		
Operating frequency range	47...400 Hz		
Maximum on time (50 Hz)	0.05 ms		
Maximum off time (50 Hz)	10 ms		
Insulation			
Test voltage between control circuit and switching circuit	4 kV _{rms}		
Test voltage between control circuit and ground	2.5 kV _{rms}		
Test voltage between switching circuit and ground	2.5 kV _{rms}		
Insulation resistance	10 ¹⁰ Ω		
General data			
Operating temperature range	-40...+90 °C		
Storage temperature range	-40...+125 °C		
Capacity between control circuit and switching circuit	8 pF		
Weight	approx. 115 g		
Approvals	UL		

Solid State Relays (SSR)

Single-phase type A8

Single-phase SSR up to 520 V switching voltage with zero voltage switch

Ordering code > V23100	-S4034-A810	-S4034-A825	-S4034-A840
Control circuit (typical values at 20 °C)			
Minimum control voltage	5 V–		
Maximum control voltage	30 V–		
Minimum control current	5 mA–		
Maximum control current	30 mA–		
Release voltage	1 V–		
Control circuit resistance	1,000 Ω		
Switching circuit (typical values at 20 °C)			
Zero voltage switch	yes		
Max. switching current (see characteristic page 24...28)	10 A _{rms}	25 A _{rms}	40 A _{rms}
Minimum switching current	5 mA _{rms}		
Nominal switching voltage	400 V _{rms}		
Switching voltage range	24...520 V _{rms}		
Maximum repetitive blocking value	1,200 V _S		
Zero voltage range	± 20 V _S		
Maximum surge current (ITSM, 10 ms)	120 A _S	230 A _S	350 A _S
Peak load integral (I ² t, 10 ms)	72 A ² s	265 A ² s	610 A ² s
Leakage current at nominal switching voltage (50 Hz)	3 mA _{rms}		
Critical rate of rise on-state current (di/dt)	100 A/μs		
Critical rate of rise off-state voltage (du/dt)	500 V/μs		
Max. on-state voltage at max. switching current	1.6 V _S		
Operating frequency range	47...400 Hz		
Maximum on time (50 Hz)	10 ms		
Maximum off time (50 Hz)	10 ms		
Insulation			
Test voltage between control circuit and switching circuit	4 kV _{rms}		
Test voltage between control circuit and ground	4 kV _{rms}		
Test voltage between switching circuit and ground	4 kV _{rms}		
Insulation resistance	10 ¹⁰ Ω		
General data			
Operating temperature range	–40...+90 °C		
Storage temperature range	–40...+125 °C		
Capacity between control circuit and switching circuit	8 pF		
Weight	approx. 115 g		
Approvals	UL, VDE		
N.B.:	Clearances and creepage distances in accordance with EN 60950: 1988 / DIN VDE 0805/5.90		

Solid State Relays (SSR)

Single-phase type A8

Single-phase SSR up to 520 V switching voltage with zero voltage switch

Ordering code	V23100	-S4034-A870	-S4034-A811
Control circuit (typical values at 20 °C)			
Minimum control voltage	5 V ₋		
Maximum control voltage	30 V ₋		
Minimum control current	5 mA ₋		
Maximum control current	30 mA ₋		
Release voltage	1 V ₋		
Control circuit resistance	1,000 Ω		
Switching circuit (typical values at 20 °C)			
Zero voltage switch	yes		
Max. switching current (see characteristic page 24...28)	70 A _{rms}		110 A _{rms}
Minimum switching current	5 mA _{rms}		
Nominal switching voltage	400 V _{rms}		
Switching voltage range	24...520 V _{rms}		
Maximum repetitive blocking voltage	1,200 V _S		
Zero voltage range	± 20 V _S		
Maximum surge current (ITSM, 10 ms)	500 A _S		1600 A _S
Peak load integral (I ² t, 10 ms)	1,250 A ² s		12,750 A ² s
Leakage current at nom. switching voltage (50 Hz)	3 mA _{rms}		
Critical rate of rise on-state current (di/dt)	100 A/μs		
Critical rate of rise off-state voltage (du/dt)	500 V/μs		
Max. on-state voltage at max. switching current	1.6 V _S		
Operating frequency range	47...400 Hz		
Maximum on time (50 Hz)	10 ms		
Maximum off time (50 Hz)	10 ms		
Insulation			
Test voltage between control circuit and switching circuit	4 kV _{rms}		
Test voltage between control circuit and ground	2.5 kV _{rms}		
Test voltage between switching circuit and ground	2.5 kV _{rms}		
Insulation resistance	10 ¹⁰ Ω		
General data			
Operating temperature range	-40...+90 °C		
Storage temperature range	-40...+125 °C		
Capacity between control circuit and switching circuit	8 pF		
Weight	approx. 115 g		
Approvals	-		

Solid State Relays (SSR)

Single-phase type A8

Single-phase SSR up to 520 V switching voltage without zero voltage switch

Ordering code	V23100	-S4334-A810	-S4334-A835	-S4334-A840
Control circuit (typical values at 20 °C)				
Minimum control voltage	5 V ₋			
Maximum control voltage	30 V ₋			
Minimum control current	5 mA ₋			
Maximum control current	30 mA ₋			
Release voltage	1 V ₋			
Control circuit resistance	1,000 Ω			
Switching circuit (typical values at 20 °C)				
Zero voltage switch	no			
Max. switching current (see characteristic page 24...28)	10 A _{rms}	25 A _{rms}	40 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching voltage	400 V _{rms}			
Switching voltage range	24...520 V _{rms}			
Maximum repetitive blocking voltage	1,200 V _S			
Zero voltage range	-			
Maximum surge current (ITSM, 10 ms)	120 A _S	230 A _S	350 A _S	
Peak load integral (I ² t, 10 ms)	72 A ² s	265 A ² s	610 A ² s	
Leakage current at nominal switching voltage (50 Hz)	3 mA _{rms}			
Critical rate of rise on-state current (di/dt)	100 A/μs			
Critical rate of rise off-state voltage (du/dt)	500 V/μs			
Max. on-state voltage at max. switching current	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	0.05 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	4 kV _{rms}			
Test voltage between switching circuit and ground	4 kV _{rms}			
Insulation resistance	10 ¹⁰ Ω			
General data				
Operating temperature range	-40...+90 °C			
Storage temperature range	-40...+125 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 115 g			
Approvals	UL, VDE			
N.B.:	Clearances and creepage distances in accordance with EN 60950: 1988 / DIN VDE 0805/5.90			

Solid State Relays (SSR)

Single-phase type A8

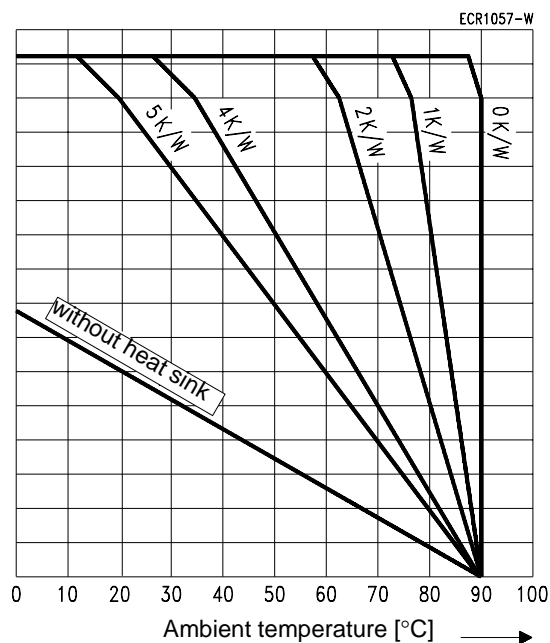
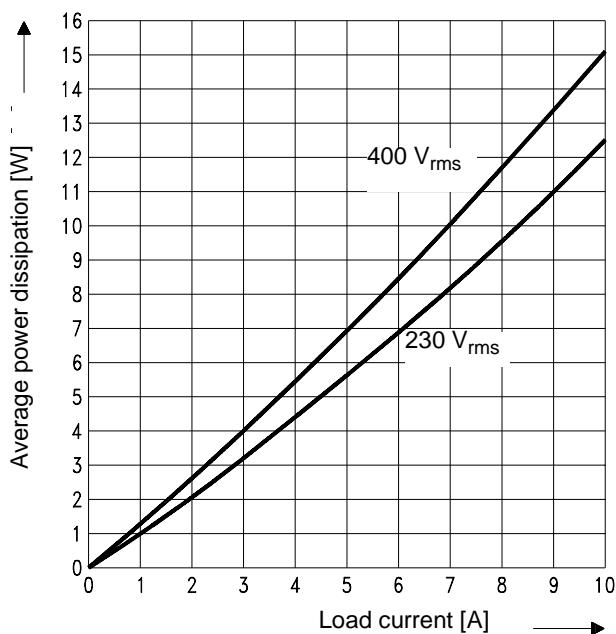
Single-phase SSR up to 520 V switching voltage without zero voltage switch

Ordering code	V23100	-S4334-A870	-S4334-A811
Control circuit (typical values at 20 °C)			
Minimum control voltage	5 V ₋		
Maximum control voltage	30 V ₋		
Minimum control current	5 mA ₋		
Maximum control current	30 mA ₋		
Release voltage	1 V ₋		
Control circuit resistance	1,000 Ω		
Switching circuit (typical values at 20 °C)			
zero voltage switch	no		
Max. switching current (see characteristic page 24...28)	70 A _{rms}		110 A _{rms}
Minimum switching current	5 mA _{rms}		
Nominal switching voltage	400 V _{rms}		
Switching voltage range	24...520 V _{rms}		
Maximum repetitive blocking voltage	1,200 V _S		
Zero voltage range	-		
Maximum surge current (ITSM, 10 ms)	500 A _S		1600 A _S
Peak load integral (I ² t, 10 ms)	1,250 A ² s		12,750 A ² s
Leakage current at nom. switching voltage (50 Hz)	3 mA _{rms}		
Critical rate of rise on-state current (di/dt)	100 A/μs		
Critical rate of rise off-state voltage (du/dt)	500 V/μs		
Max. on-state voltage at max. switching current	1.6 V _S		
Operating frequency range	47...400 Hz		
Maximum on time (50 Hz)	0.05 ms		
Maximum off time (50 Hz)	10 ms		
Insulation			
Test voltage between control circuit and switching circuit	4 kV _{rms}		
Test voltage between control circuit and ground	2.5 kV _{rms}		
Test voltage between switching circuit and ground	2.5 kV _{rms}		
Insulation resistance	10 ¹⁰ Ω		
General data			
Operating temperature range	-40...+90 °C		
Storage temperature range	-40...+125 °C		
Capacity between control circuit and switching circuit	8 pF		
Weight	approx. 115 g		
Approvals	-		

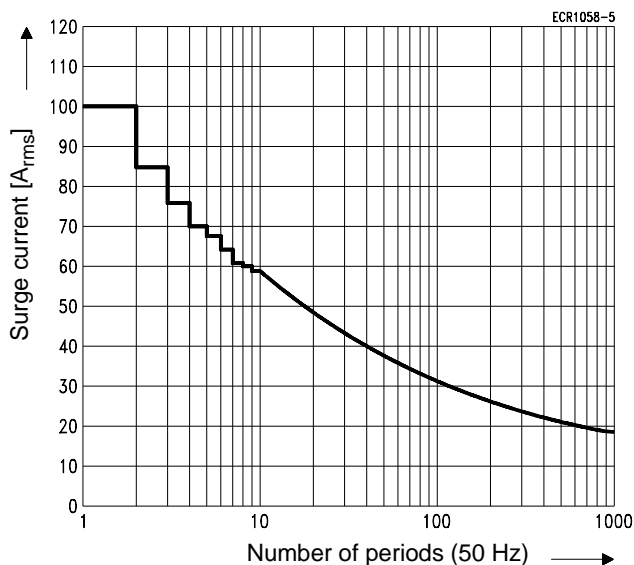
Solid State Relays (SSR) Types A2 and A8

Characteristics for 10 A_{rms} single-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature.

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...).

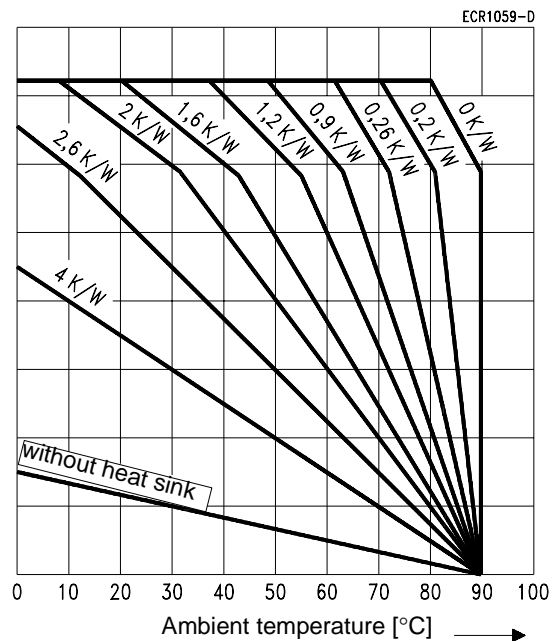
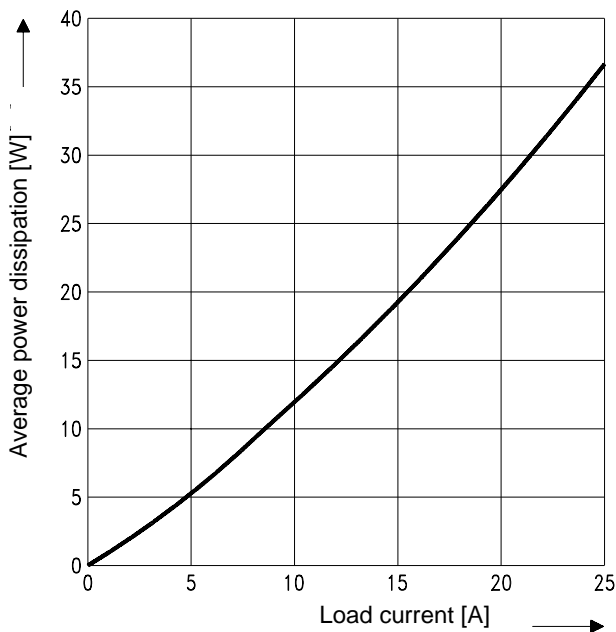
Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

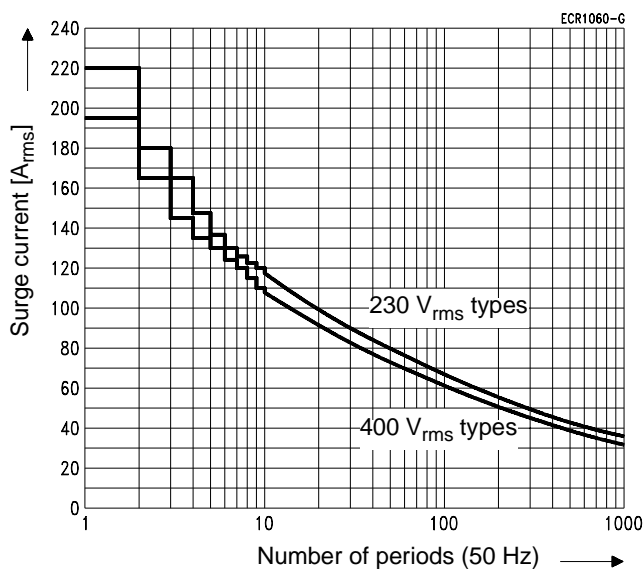
Solid State Relays (SSR) Types A2 and A8

Characteristics for 25 A_{rms} phasing SSR types

Performance diagrams for the selection of the heat sink



Maximum surge current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature.

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...).

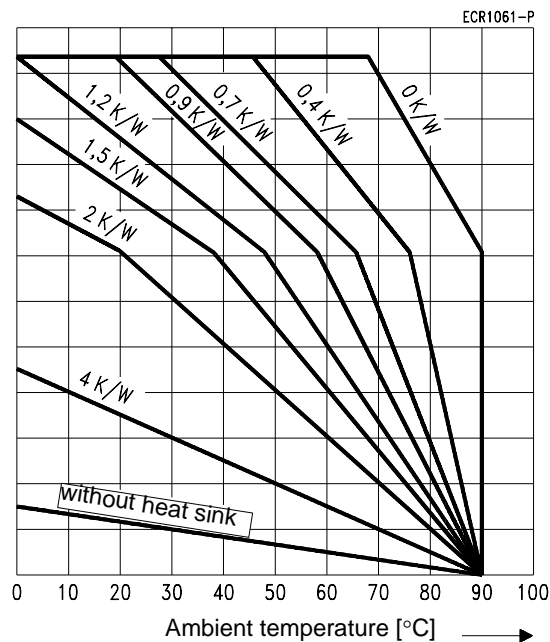
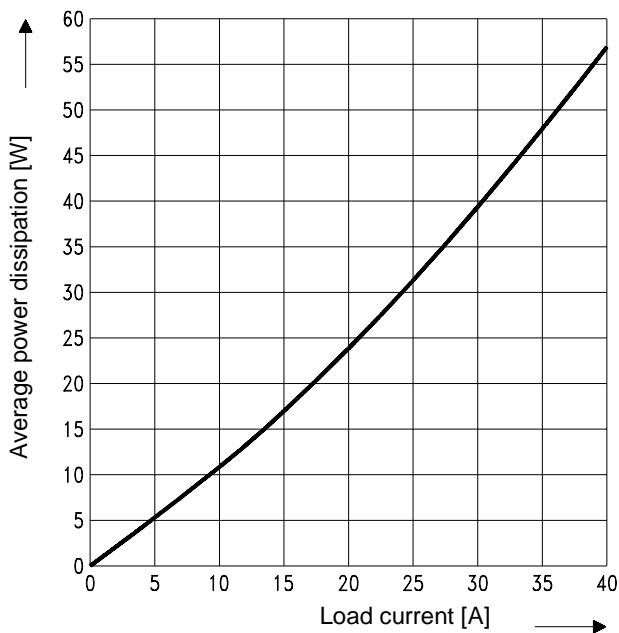
Maximum surge current:

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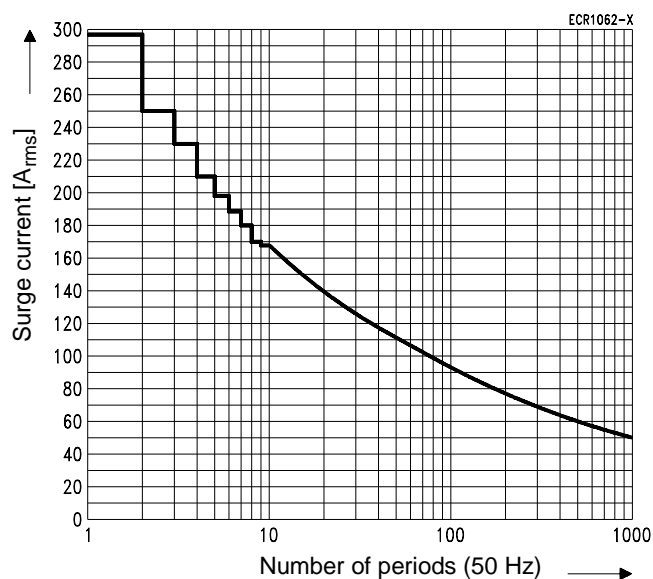
Solid State Relays (SSR) Types A2 and A8

Characteristics for 40 A_{rms} single-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...)

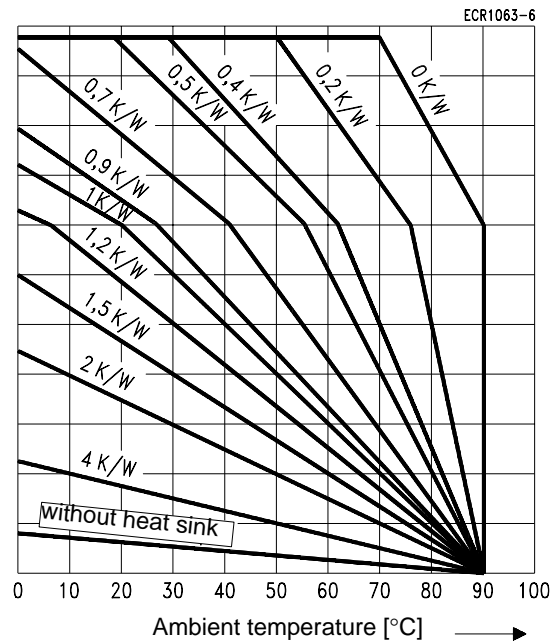
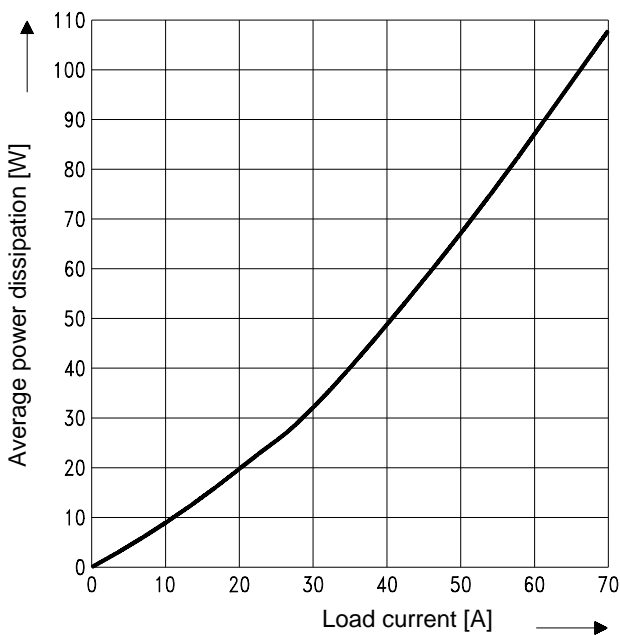
Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

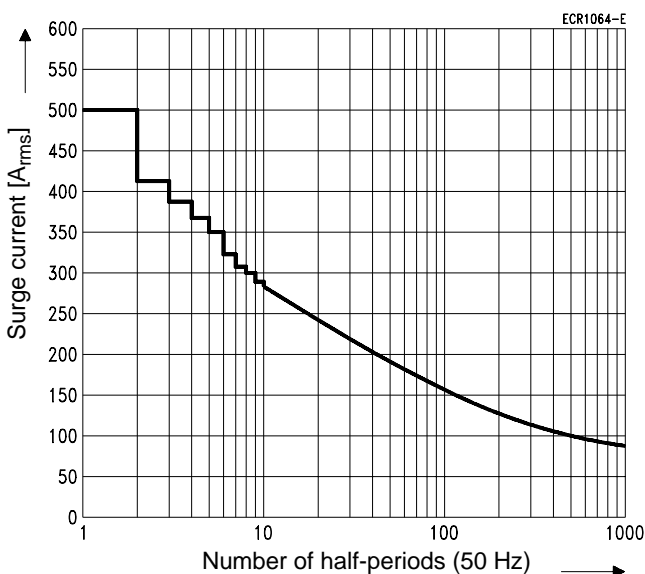
Solid State Relays (SSR) Types A2 and A8

Characteristics for 70 A_{rms} single-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...)

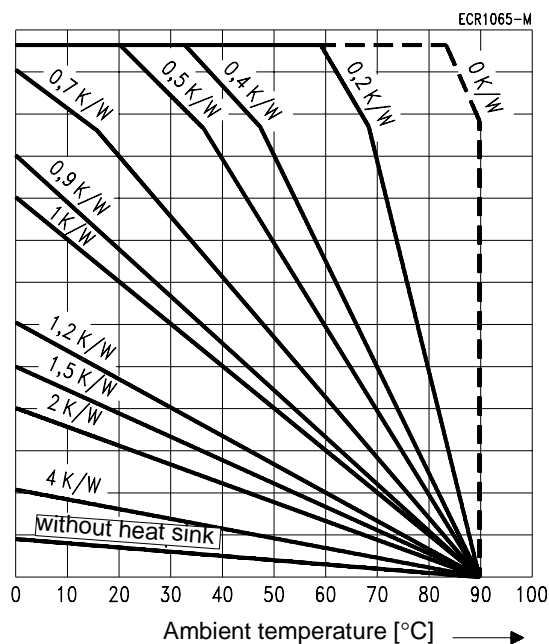
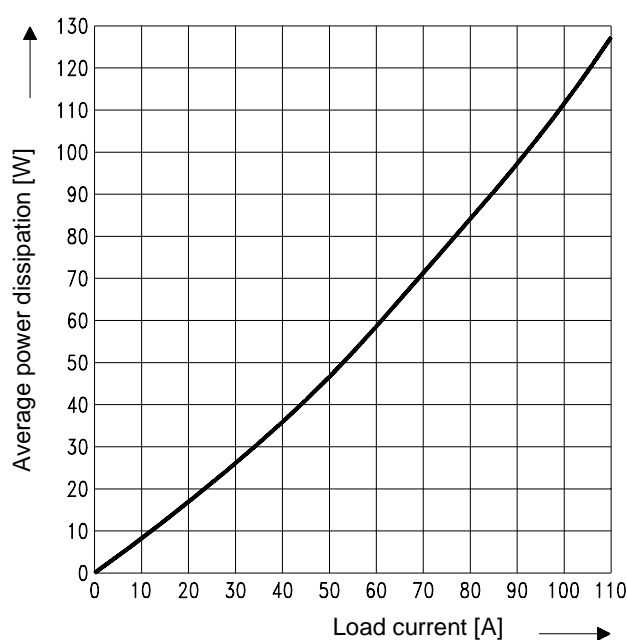
Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

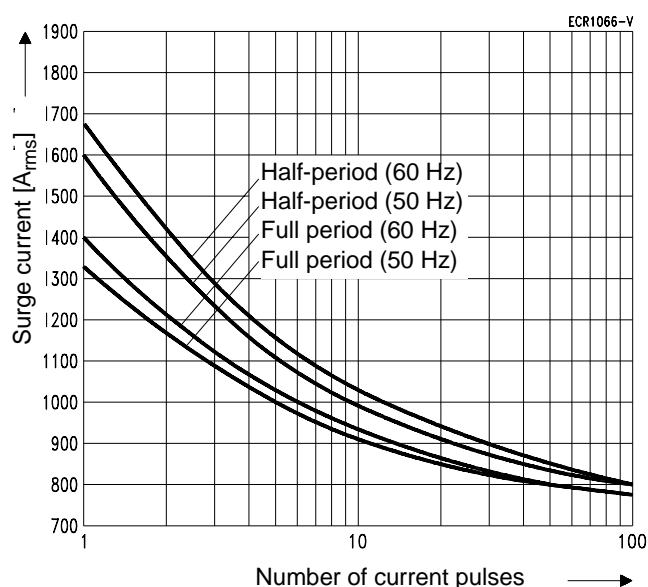
Solid State Relays (SSR) Types A2 and A8

Characteristics for 110 A_{rms} single-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...)

Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

Solid State Relays (SSR) Type C2

Dimension drawing (mm) three-phase SSR

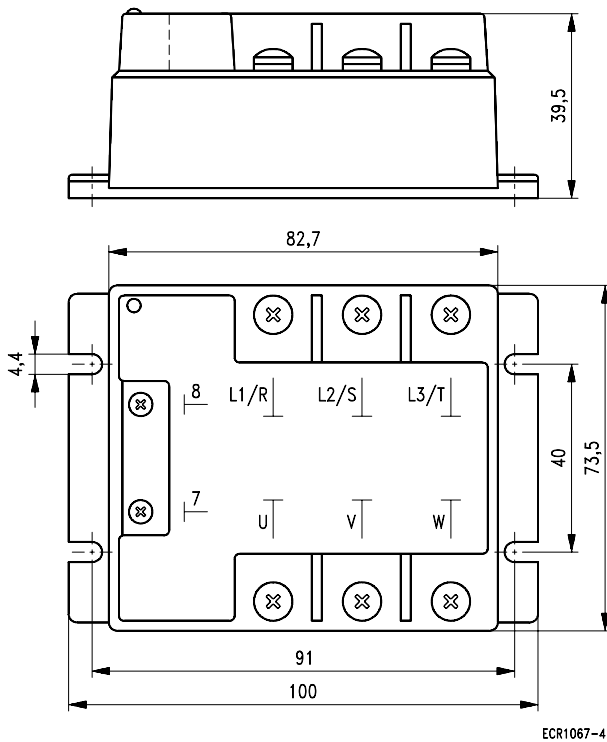
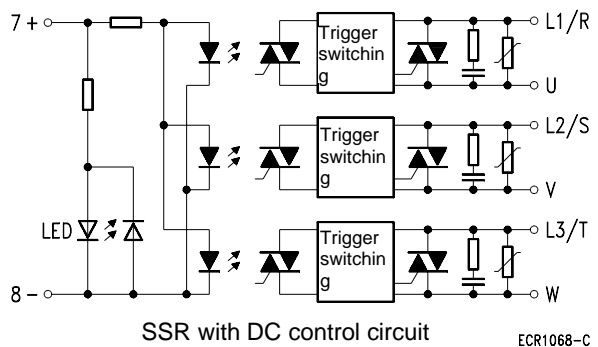
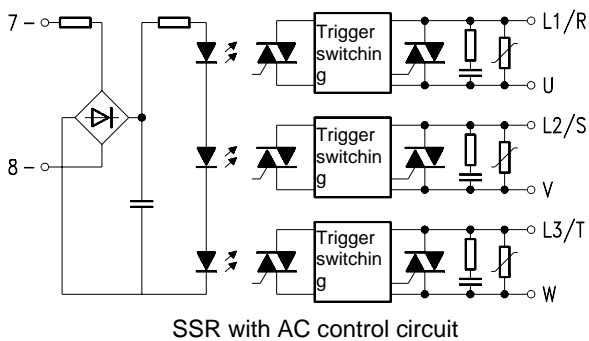


Illustration approximately 2/3 of the original size

Terminal assignment



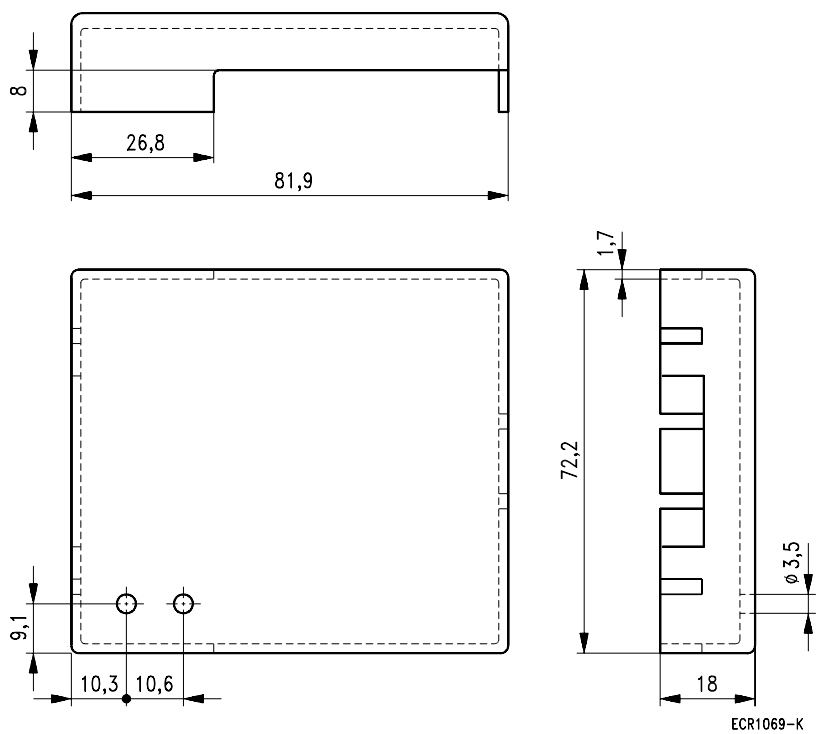
Mounting

Screw terminals for two single-wire cables up to 6 mm² for the switching circuit and up to 4 mm² for the control circuit with cable clamps.

Bus bars and heat sinks intended to be unaffected by additional strain and pressure. Power supply leads must have a cross-section sufficient to avoid heating up the relay. This is particularly true for direct mounting with preconnected fuses.

Solid State Relays (SSR) Type C2

Dimension drawing (mm) plastic cap



Approximate weight: 27,2 g

Shock-hazard protection against the voltage-carrying connection clips, in unprotected systems.

Ordering code	V23100-Z2009
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Solid State Relays (SSR)

Type C2

Three-phase SSR up to 520 V switching voltage with zero voltage switch, dust-protected

Ordering code	V23100	-S3712-C240	-S3621-C240	-S3712-C270
Control circuit (typical values at 20 °C)				
Minimum control voltage	5 V ₋	80 V _~	5 V ₋	
Maximum control voltage	30 V ₋	240 V _~	30 V ₋	
Minimum control current	19 mA ₋	4 mA _~	19 mA ₋	
Maximum control current	110 mA ₋	11 mA _~	110 mA ₋	
Release voltage	2 V ₋	5 V _~	2 V ₋	
Control circuit resistance	270 Ω	22 kΩ	270 Ω	
Switching circuit (typical values at 20 °C)				
Zero voltage switch	yes			
Max. switching current (see characteristic page 18...22)	40 A _{rms}		70 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching current	400 V _{rms}			
Switching voltage range	24...520 V _{rms}			
Maximum repetitive blocking current (current limited by varistor)	1,200 V _S (800 V _S)			
Zero switching range	± 20 V _S			
Maximum surge current (ITSM, 10 ms)	350 A _S		500 A _S	
Peak load integral (I ² t, 10 ms)	610 A ² s		1250 A ² s	
Leakage current at nominal switching voltage (50 Hz)	< 4 mA _{rms}			
Critical rate of rise on-state current (di/dt)	20 A/μs			
Critical rate of rise off-state voltage (du/dt)	500 V/μs			
Max. on-state voltage at max. switching voltage	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	10 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	2.5 kV _{rms}			
Test voltage between switching circuit and ground	2.5 kV _{rms}			
General data				
Operating temperature range	-40...+90 °C			
Storage temperature range	-40...+150 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 300 g			
Approvals	on request			
N.B.:	Other versions of three-phase SSRs available on request			

Solid State Relays (SSR)

Type C2

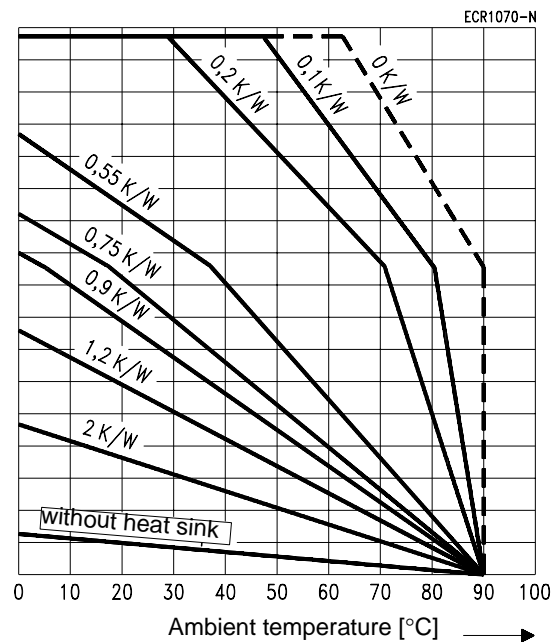
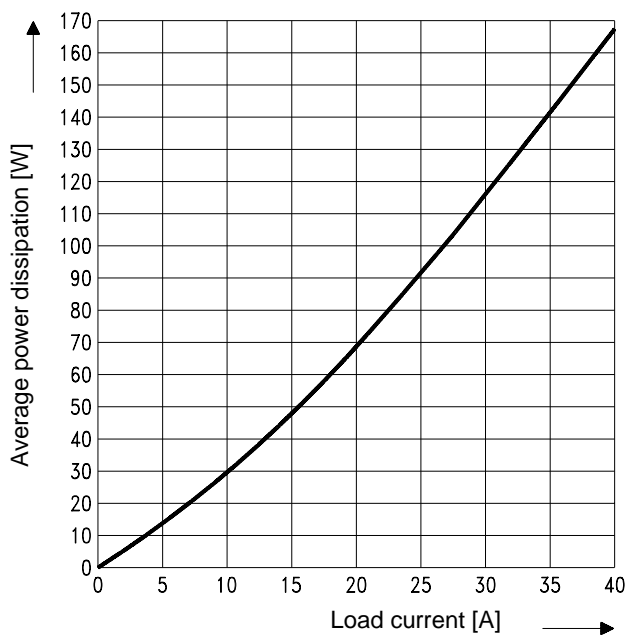
Three-phase SSR type C2 up to 520 V switching voltage without zero voltage switch, dust-protected

Ordering code	V23100	-S5712-C240	-S5621-C240	-S5712-C270
Control circuit (typical values at 20 °C)				
Minimum control voltage	5 V ₋	80 V _~	5 V ₋	
Maximum control voltage	30 V ₋	240 V _~	30 V ₋	
Minimum control current	19 mA ₋	4 mA _~	19 mA ₋	
Maximum control current	110 mA ₋	11 mA _~	110 mA ₋	
Release voltage	2 V ₋	5 V _~	2 V ₋	
Control circuit resistance	270 Ω	22 kΩ	270 Ω	
Switching circuit (typical values at 20 °C)				
Zero voltage switch	no			
Max. switching current (see characteristic page 18...22)	40 A _{rms}		70 A _{rms}	
Minimum switching current	5 mA _{rms}			
Nominal switching voltage	400 V _{rms}			
Switching voltage range	24...520 V _{rms}			
Maximum repetitive blocking voltage (Voltage limited by varistor)	1,200 V _S (800 V _S)			
Zero voltage range	-			
Maximum surge current (ITSM, 10 ms)	350 A _S		500 A _S	
Peak load integral (I ² t, 10 ms)	610 A ² s		1250 A ² s	
Leakage current at nominal switching voltage (50 Hz)	< 4 mA _{rms}			
Critical rate of rise on-state voltage(di/dt)	20 A/μs			
Critical rate of rise off-state current (du/dt)	500 V/μs			
Max. on-state voltage at max. switching current	1.6 V _S			
Operating frequency range	47...400 Hz			
Maximum on time (50 Hz)	0.1 ms			
Maximum off time (50 Hz)	10 ms			
Insulation				
Test voltage between control circuit and switching circuit	4 kV _{rms}			
Test voltage between control circuit and ground	2.5 kV _{rms}			
Test voltage between switching circuit and ground	2.5 kV _{rms}			
General data				
Operating temperature range	-40...+90 °C			
Storage temperature range	-40...+150 °C			
Capacity between control circuit and switching circuit	8 pF			
Weight	approx. 300 g			
Approvals	on request			
N.B.:	Other versions of three-phase SSRs on request			

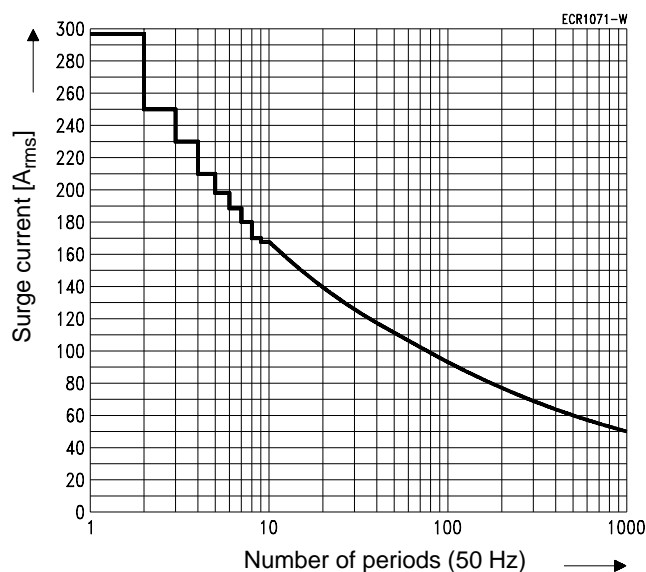
Solid State Relays (SSR) Type C2

Characteristics for 40 A_{rms} three-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...)

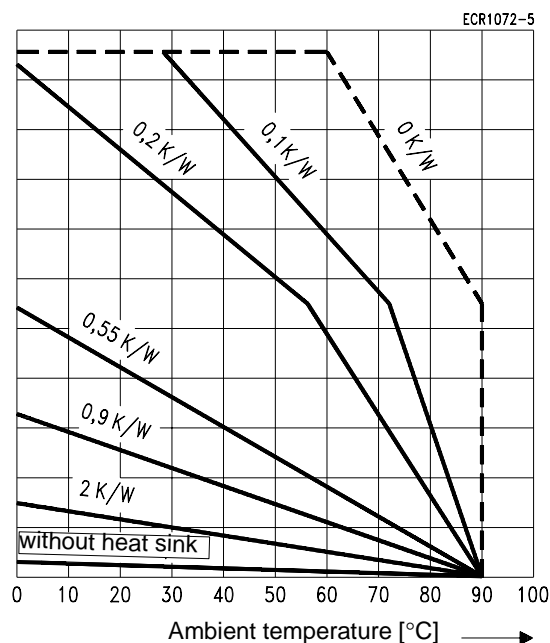
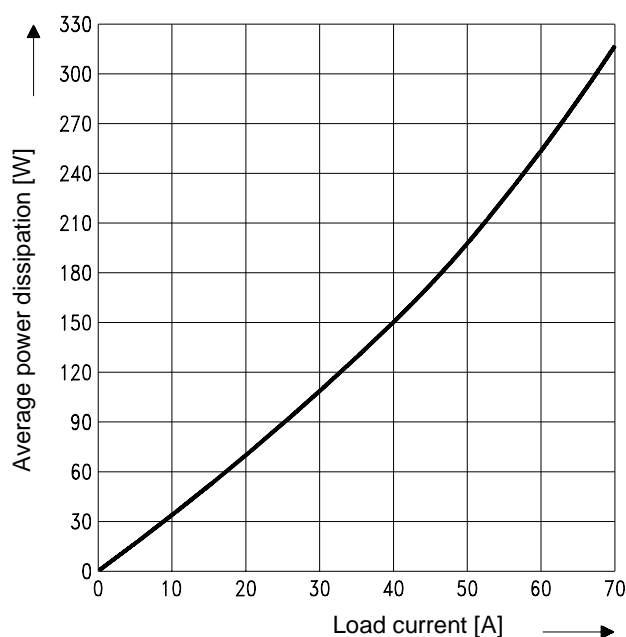
Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

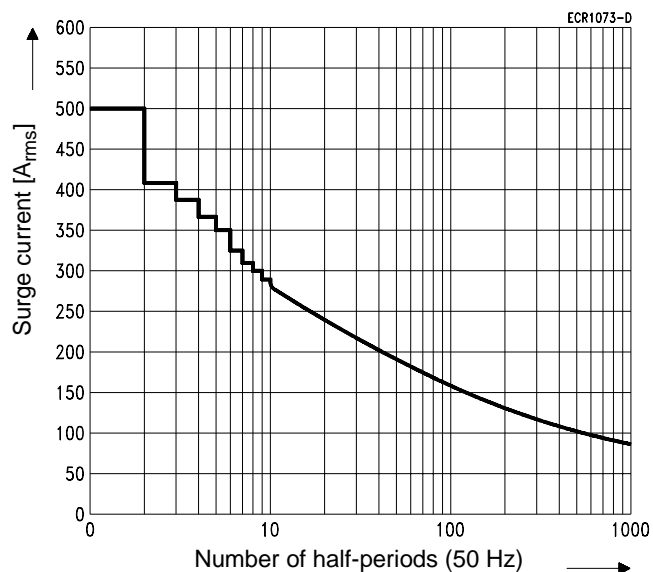
Solid State Relays (SSR) Type C2

Characteristics for 70 A_{rms} three-phase SSR types

Performance diagrams for the selection of the heat sink



Maximum accidental overload current ITSM (not periodical)



Important information:

Performance diagrams:

In order to reach the prescribed current values, mounting must take place on a finned heat sink or a cooling plate. The performance diagrams show how the **thermal resistance** of the heat sink appropriate to the relay can be determined independently of the load current and the ambient temperature

The **thermal resistance** only applies to heat sinks with vertical cooling ribs. A safety factor (30%) must be taken into account under difficult conditions (e.g. switching cabinet without ventilation...)

Maximum surge current:

If loaded with the maximum surge current, the permitted junction temperature is exceeded. A temporary loss of blocking ability can be anticipated. It is necessary to disconnect from the mains. Switching on again is permitted only after cooling down to the crystal temperature permitted for normal operation. The maximum surge current may be utilized only occasionally, i.e. in the event of a malfunction.

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